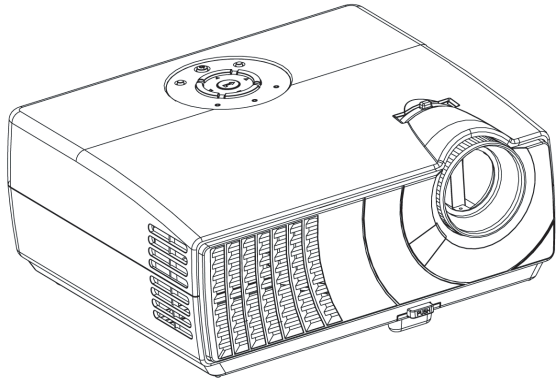
TOSHIBA

FILE NO. 330-200601GR

SERVICE MANUAL

DLP DATA PROJECTOR

TDP-T9
TDP-T8
TDP-S8



The above models are classified as green product (s) (*1), as indicated by the underlined serial number (s).
This Service Manual describes replacement parts for green product (s). When repairing any green product (s), use the parts described in this manual and lead-free solder (*2).
For (*1) and (*2) , see the next page.

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(*1) GREEN PRODUCT PROCUREMENT

The EC is actively promoting the WEEE & RoHS Directives that define standards for recycling and reuse of Waste Electrical and Electronic Equipment and for the Restriction of the use of certain Hazardous Substances. From July 1, 2006, the RoHS Directive will prohibit any marketing of new products containing the restricted substances.

Increasing attention is given to issues related to the global environmental. Toshiba Corporation recognizes environmental protection as a key management tasks, and is doing its utmost to enhance and improve the quality and scope of its environmental activities. In line with this, Toshiba proactively promotes Green Procurement, and seeks to purchase and use products, parts and materials that have low environmental impacts.

Green procurement of parts is not only confined to manufacture. The same green parts used in manufacture must also be used as replacement parts.

(*2) LEAD-FREE SOLDER

This product is manufactured using lead-free solder as a part of a movement within the consumer products industry at large to be environmentally responsible. Lead-free solder must be used in the servicing and repair of this product.

WARNING

This product is manufactured using lead free solder.

DO NOT USE LEAD BASED SOLDER TO REPAIR THIS PRODUCT !

The melting temperature of lead-free solder is higher than that of leaded solder by 86°F to 104°F (30°C to 40°C). Use of a soldering iron designed for lead-based solders to repair product made with lead-free solder may result in damage to the component and or PCB being soldered. Great care should be made to ensure high-quality soldering when servicing this product — especially when soldering large components, through-hole pins, and on PCBs — as the level of heat required to melt lead-free solder is high.

Preface

This manual is applied to S8 T8 T9 0.55” DMD SVGA (S8) and XGA (T8/T9) digital projection system. It’s the mode of single Panel, 180 Watt Compact P-VIP Lamp and 800(H) x 600(V) (S8) and 1024(H) x 768(V) (T8/T9) and resolution. The manual gives you a brief description of basic technical information to help in service and maintaining the product.

Your customers will appreciate the quick response time when you immediately identify problems that occur with our products. We expect your customers will appreciate the service that you offer them.

This manual is for technicians and people who have an electronic background. Send the product back to the distributor for repairing and do not attempt to do anything that is complex or is not mentioned in the troubleshooting.

NOTICE :

The information found in this manual is subject to change without prior notice. Any subsequent changes made to the data herein will be incorporated in further edition.

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Manual Version 1.0

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Introduction

T9/T8/S8 main different parts			
Parts \ Model	**T9**	**T8**	**S8**
MAIN BOARD	T9 F/W	Same as T9	S8 F/W
DMD Chip	0.55 XGA	0.55 XGA(Same as T9)	0.55SVGA
Top Cover	T9	T8	S8
Bottom Cover	T9	Same as T9	S8
Front Cover	T9	T8	Same as T9
Rear Cover	T9	Same as T9	S8
Lamp Cover	T9	Same as T9	S8
KEYPAD CAP	T9	Same as T9	S8
ELEVATOR BASE	T9	Same as T9	S8
ELEVATOR PUSH BUTTON	T9	Same as T9	S8
Remove Controller	Interlink (with mouse)	SMK(Same as S8)	SMK
User's Manual (CD)	T9	T8	S8
User's Manual (Paper)	T9	T8	S8
Spec label	T9	T8	S8
Battery	T9 #4	Same as S8	S8 #3

1-1 Highlight

No	Item	Description
1	DMD	One panel 0.55" DMD SVGA projection system (S8) One panel 0.55" DMD XGA projection system (T8 / T9)
2	Lamp	200W Lamp dimmable to 180W
3	Cooling System	High efficiency cooling system with low system acoustic noise level
4	Weight	Light weight < 4.5 lbs
5	Zoom lens	Manual focus projection 1:1.10 zoom lens

No	Item	Description
6	Resolution	True 800X600 resolution, 16.7M True colors (S8) True 1024 X 768 resolution, 16.7M True colors (T8/T9)
7	Video capability	-With up, down, left, and right screen reverse -Build-in full screen NTSC/PAL/SECAM video capability with S-video / Composite / component through D-sub terminals -SXGA/XGA/SVGA/VGA/MAC compatibility. -Auto image re-sizing to 800x600 full screen (S8) -Auto image re-sizing to 1024 x 768 full screen (T8/T9) -Auto detection of computer signal input -Auto Image synchronization (Auto-tracking /frequency /position adjustment) -Powerful enlarge and freeze function
8	Expandiability	Automatically saves adjustments for future use
9	Language	On-screen menu with 14 languages
10	Voltage	Adaptive voltage control fan speed
11	Speaker	Built-in one speaker with 2 Watt amplifier

1-2 Mechanical Specifications

No	Item	Description
1	Dimensions (WxHxD)	239*107*207 mm
2	Weight	< 4.5 lbs.
3	Cooling System	-Advanced air flow -Two fans with low system acoustic noise level -Temperature control circuits with adaptive voltage control fan speed -Maximum touch temperature follows UL60950
4	Cabinet	Provides space for PCB boards, fan, optical engine, power supply Lamp
5	Tilt Angle	6 degree with elevator mechanism
6	Keystone correction	+/ -15 degree

No	Item	Description
7	Lamp Door Protection	Lamp power supply shut off automatically when door open

1-3 Electrical Specifications

No	Item	Description
1	Power Supply	-Universal AC 100--240V~ 50 / 60 Hz with PFC input -200W Lamp @ normal operation -Variance FAN speed control (Depend on temperature variance)
2	Power Consumption	-250 Watt +/- 10% at normal operation -Stand-by mode < 13W
3	Terminals	-One D-Sub 15-pin female connector for analog RGB / HDTV component video -One D-Sub 15-pin female connector for monitor output -One 3.5 mm phone jack for audio input -One 3.5 mm phone jack for audio output -One Mini DIN 4-pin for S-Video Input -One RCA Jack for Composite Video Input -RS232 connector
4	Input signal spec.	-PC Signal -Hsync Frequency 31.35~80 kHz -Vsync Frequency 56 ~ 85 Hz -Video Signal RGB (PC) -Analog RGB 0.7Vp-p, 75 ohm -Analog RGB 1Vp-p, 75 ohm, Sync. signal -Separate TTL H,V Sync. -Composite TTL Sync. -Video -Composite video 1Vp-p,75 ohm -S-video Luminance 75 ohm -Chrominance 75 ohm
5	System Controller	TI DDP2000
6	Video Compatibility	Standards : NTSC: M (3.58MHz), 4.43 MHz PAL: B, D, G, H, I, M, N SECAM: B, D, G, K, K1, L HDTV: 480i/p, 576i/p, 720p, 1080i

No	Item	Description
7	On-Screen Display Menu	14 languages selection: English, François, German, Italiano, Espanol, Portuguese, Russian, Swedish, Turkism, Polish, Japanese, Simplify Chinese, Traditional Chinese, Korea

1-4 Optical Specifications

No	Item	Description
1	Projection lens	F# 2.7 – 3.0 @2.4m, f = 21.8 ~23.8mm @2.4m. 1.10X Manual Zoom Lens. (S8) - F# 2.7 – 3.0 @2.4m, f = 21.81 ~ 23.77 mm @2.4m. 1.10X Manual Zoom Lens. (T8/T9)
2	Projection Image Size	Adjustable from 34.67” to 254.22” (Diagonal)
3	Throw Distance	Suggested throw distance: 1.5~10m (Optical Performance)
4	Throw Ratio	1.94 ~ 2.13; 100”/3.94m ~ 4.33m
5	Brightness	-1600 ANSI Lumens (Typical) (S8) -1440 ANSI Lumens (Minimum) (S8) - 1800 ANSI Lumens (Typical) (T8/T9) - 1600 ANSI Lumens (Minimum) (T8/T9)
6	Contrast	-1800:1 Typical (Full on / full off) -1200:1 Minimum (Full on / full off)
7	Uniformity	-60% Typical ANSI -50% Minimum ANSI
8	TV Distortion	-Horizontal-Up: <= |+/-1%| -Horizontal-Down: <= |+/-1%| -Vertical: <= |+/-1%|
9	Lens Offset	115%+/-10%
10	Lamp	Osram E17.5e 200W P-VIP Lamp

1-5 Environmental

No	Item	Description
1	Tempera-ture	- Operating: 5 - 35°C - Storage: -20- - 60°C If the lamp temp is too high, the warning message will appear.
2	Maximum Humidity	- Operating: 5 - 35°C, 80% RH (Max.), non-condensing - Storage: -20- - 60°C, 80%RH (Max.), non-condensing
3	Acoustic noise level	- Normal mode: 38 dB(A)(typical at 23 +/-2 degree C) - Dim mode: 35 dB(A) (typical at 23 +/-2 degree C) - Noise measurement follows ISO 7779, A-weighted sound pres-sure level measurement, 7200 rpm color wheel rotational speed
4	Lamp life	3000 hours marketing at full power mode Up to 2000 hours with 50% survival rate/ 50% maintenance to initial lumens at full power mode (According to current lamp specification) 5000 hours marketing at eco-mode Up to 3000 hours with 50% survival rate/ 50% maintenance to initial lumens at eco-mode (According to current lamp specifica-tion)
5	Altitude	- Operating 0~2,500 ft, for 5°C~35°C 2,500~5,000 ft, for 5°C~30°C 5,000~10,000 ft, for 5°C~25°C - Storage 40,000 ft
6	MTBF	- Operating more than 12,000 hours (90% Confidence Level)

1-6 Compatible Mode

Analog (S8/T8/T9)

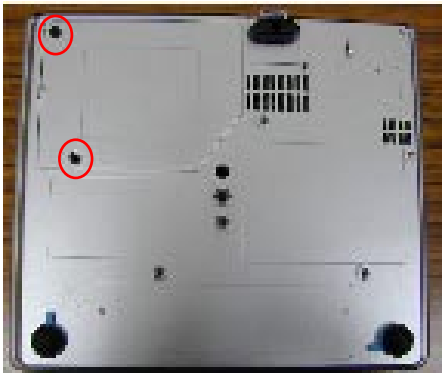
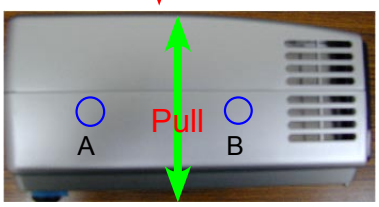
Compatibility	Resolution	V-Sync [Hz]	H-Sync [KHz]
VGA	640x350	70	31.5
	640x350	85	37.9
	640x400	85	37.9
	640x480	60	31.5
	640x480	72	37.9
	640x480	75	37.5
	640x480	85	43.3
	720x400	70	31.5
	720x400	85	37.9
SVGA	800x600	56	35.2
	800x600	60	37.9
	800x600	72	48.1
	800x600	75	46.9
	800x600	85	53.7
XGA	1024x768	60	48.4
	1024x768	70	56.5
	1024x768	75	60.0
	1024x768	85	68.7
SXGA	1152x864	70	63.8
	1152x864	75	67.5
	1152x864	85	77.1
	1280x960	60	60
	1280x960	75	75
	1280x1024	60	63.98
	1280x1024	75	79.98
MAC 16”	832x624	74.55	49.725
MAC 19”	1024x768	75	60.24
MAC	1152x870	75.06	68.68
MAC G4	640x480	60	31.35
i Mac DV	1024x768	75	60
i Mac DV	1152x870	75	68.49
i Mac DV	1280x960	75	75

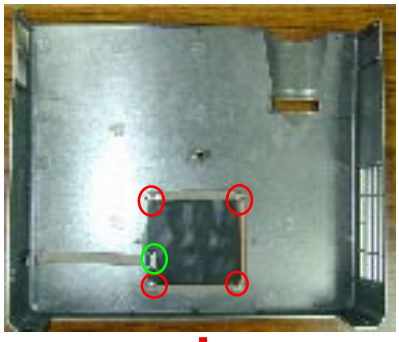
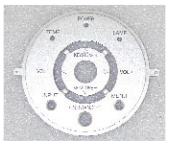
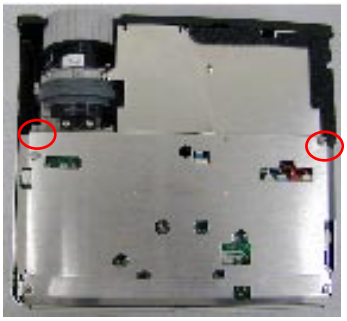
Disassembly Process

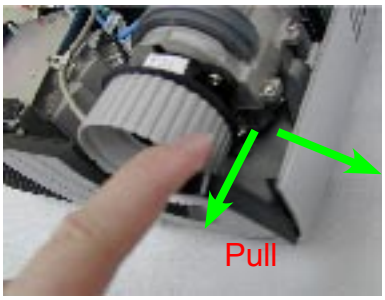
2-1 Equipment Needed

Item	Photo	Item	Photo
Screw Bit (+) :107		Hex Sleeves 5mm	
Screw Bit (+) :102		Screw Bit (+) :101	
Screw Bit (-) :101			

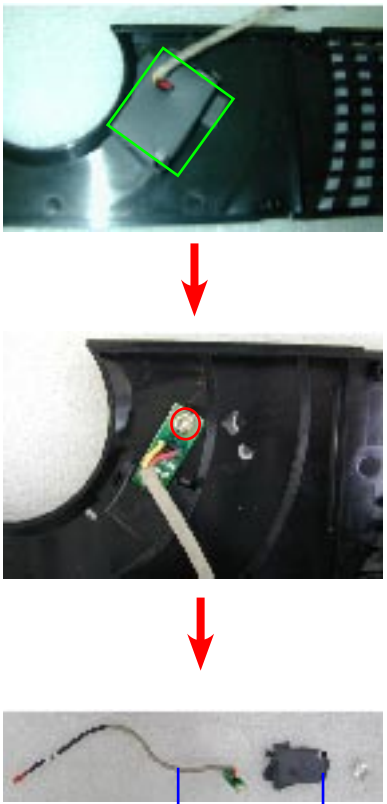
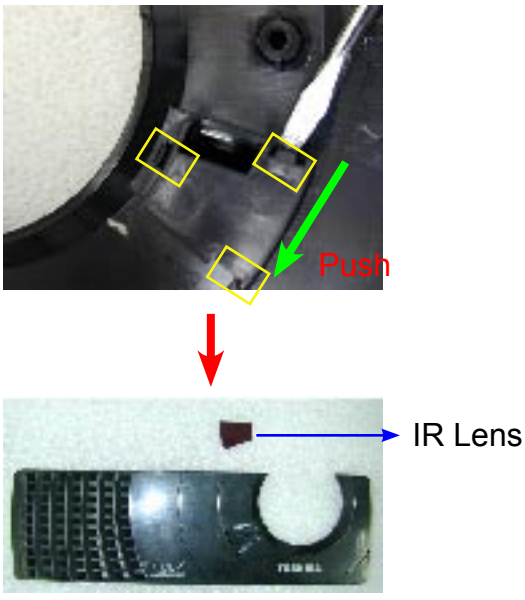
2-2 Disassemble Lamp, Keypad Board, Top Cover and Front Cover

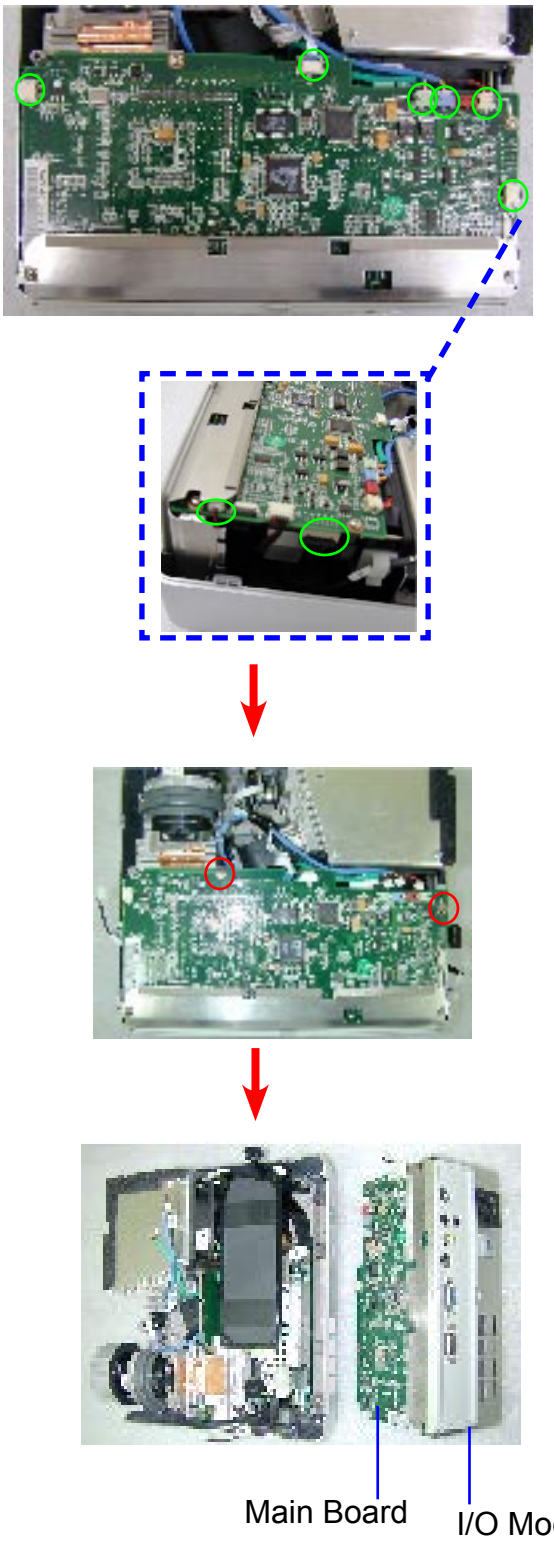
No	Procedure	Photo
1	Loosen 2 screws to remove the Lamp Cover	
2	Loosen 2 screws to remove Lamp Module	 Lamp Lamp Cover
3	Unscrew 1 screw and press the left tenon (A) on the lower cover first and then press the right one (B) on the lower cover to pull the bilateral sides to remove Top Cover.	  Top Cover

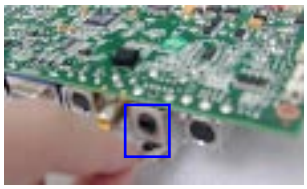
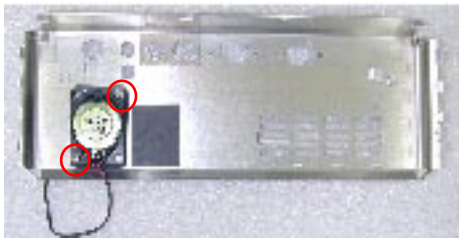
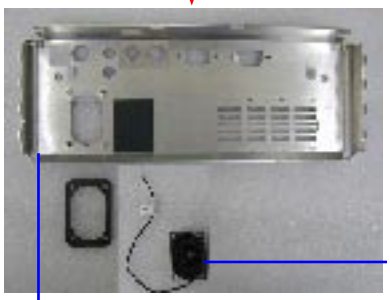
No	Procedure	Photo
4	Tear off the mylar first. Unplug the FFC cable and unscrew 4 screws to remove Keypad Button, Enter Key and Keypad Board.	 Keypad Button Keypad Board FFC Cable  Enter Key Keypad Cap Top Cover
5	Unscrew 2 screws to remove Top Cover Shielding.	 Top Cover Shielding

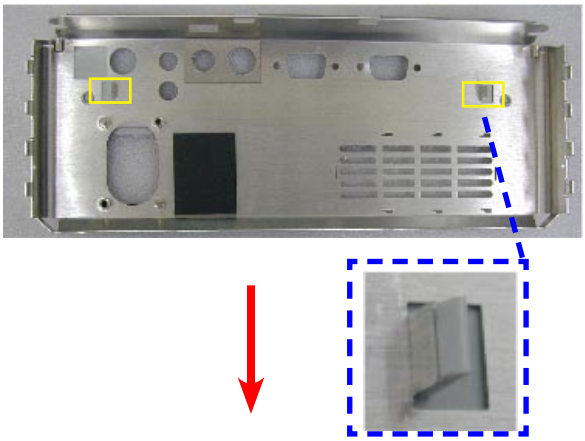
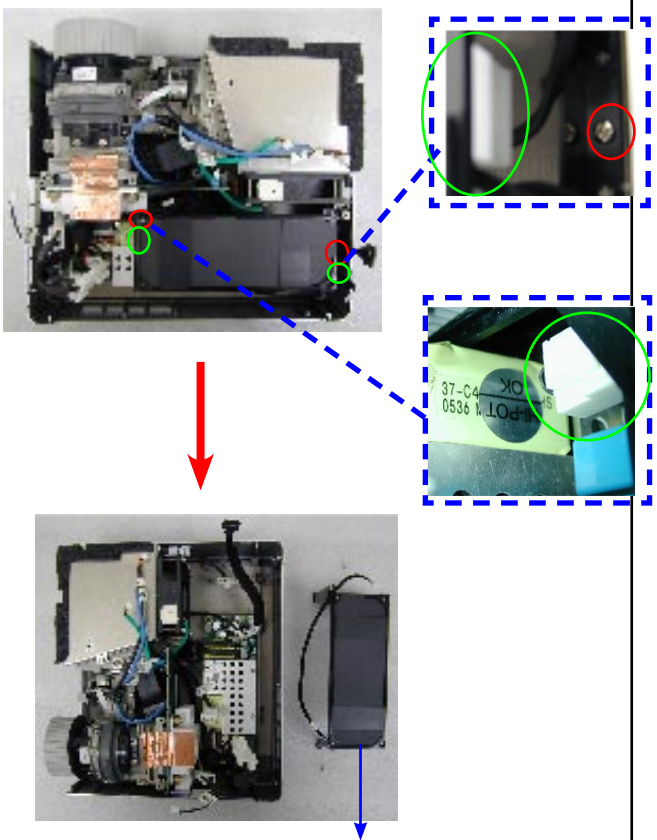
No	Procedure	Photo
6	Unscrew 2 screws to remove Lamp Plate.	Lamp Iron Plate
7	Unplug the red connector from Main Board, unscrew 1 screw and pull Buttom Cover outwards and pull forward Front Cover to remove it.	 Front Cover

2-3 Disassemble IR Sensor Board, Main Board, I/O Module, Speaker, Back Cover and Lamp Driver

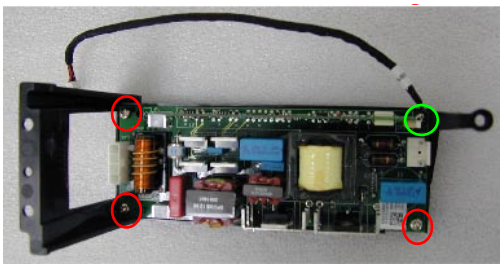
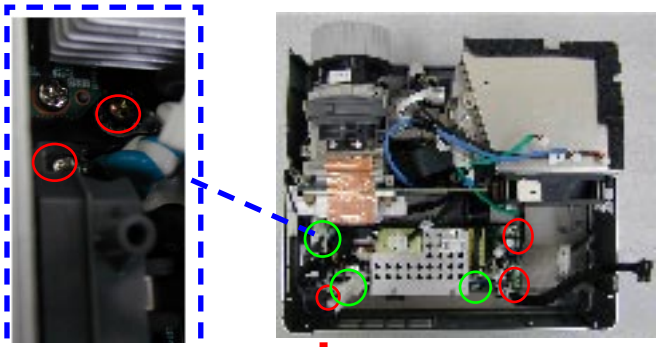
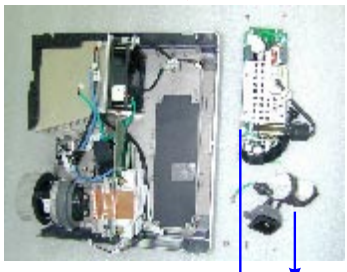
No	Procedure	Photo
1	Take off the maylar first, unscrew 1 screw to remove IR Sensor Board.	
2	Push the three tenons to remove IR Lens and Front Cover.	

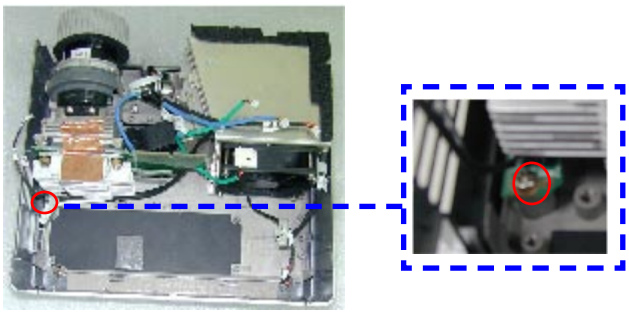
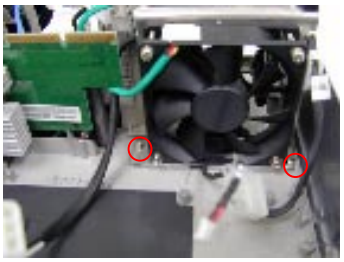
No	Procedure	Photo
3	Unplug 8 connectors and unscrew 2 screws to separate Main Board and I/O Module from the unit..	

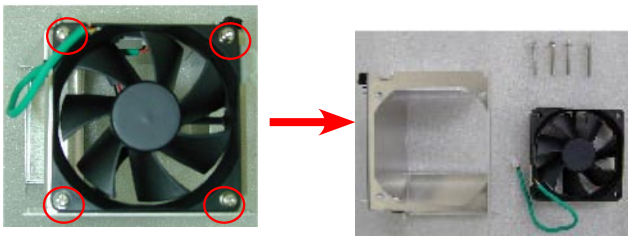
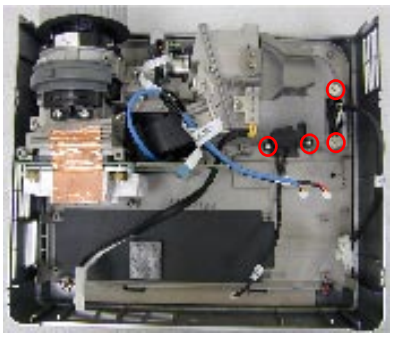
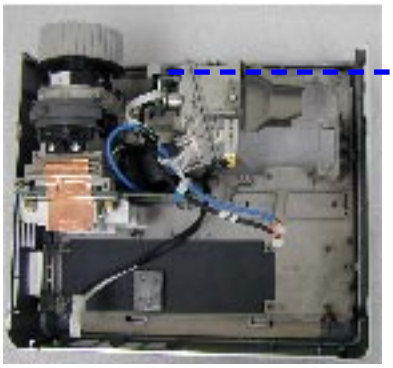
No	Procedure	Photo
4	Unscrew 2 screws and 4 hex screws to separate Main Board and I/O Module.	  Notice: Please re-attach EMI gasket to the position shown in the red circle again after replacing Main Board.
5	Unscrew 2 screws to remove Speaker Sponge and Speaker from EMI Shielding Back Cover.	  Speaker EMI Shielding Back Cover

No	Procedure	Photo
6	Push the tenons (in yellow circle) to remove Back Cover from EMI Shielding Back Cover.	 EMI Shielding Back Cover
7	Unscrew 2 screws and unplug 2 connectors to remove Lamp Driver Module.	 Lamp Driver Module

2-4 Disassemble Lamp Driver Module, LVPS, Thermal Sensor, Fan Module, Photo Sensor and Color Wheel

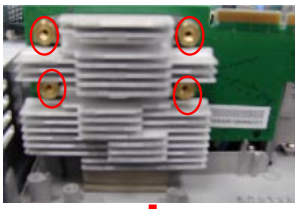
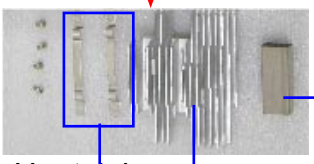
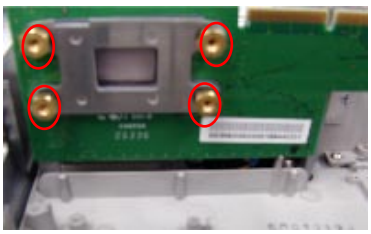
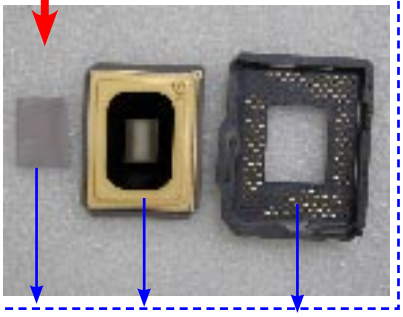
No	Procedure	Photo
1	Unscrew 4 screws and unplug one connector to separate Lamp Driver from Lamp Driver Holder and the connector.	 Lamp Driver Module
2	Unscrew 5 screws and un-plug 3 connectors to remove LVPS and AC Socket.	  LVPS AC Socket

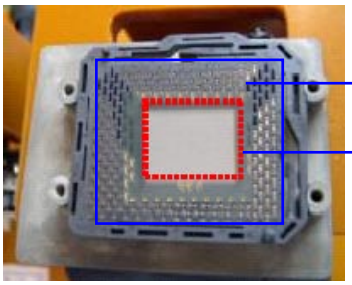
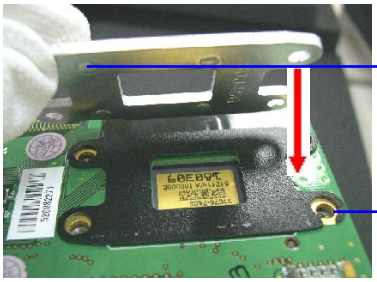
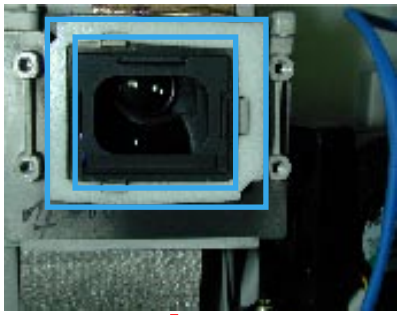
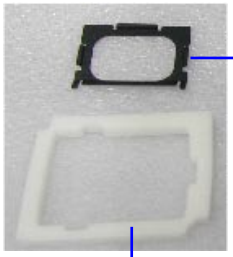
No	Procedure	Photo
3	Unplug 2 connectors to remove 2 pin connector and 14 pin connector from LVPS.	
4	Unscrew 1 screw to remove Thermal Sensor Board.	 Thermal Sensor Board
5	Unscrew 2 screws to re-move Fan Module.	 Fan Module

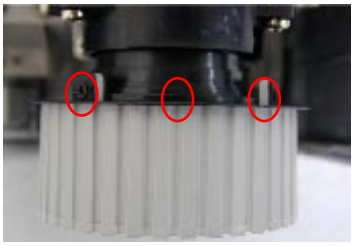
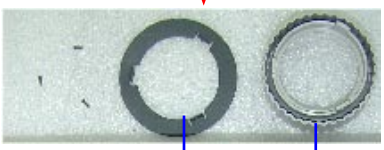
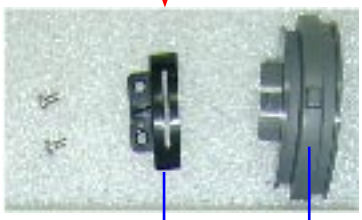
No	Procedure	Photo
6	Unscrew 4 screws to break down Fan module.	
7	Unscrew 4 screws to re-move Lamp Cable and Limit Switch.	 Limit Switch Lamp Driver Cable
8	Unscrew 1 screw to remove Photo Sensor.	 Photo Sensor

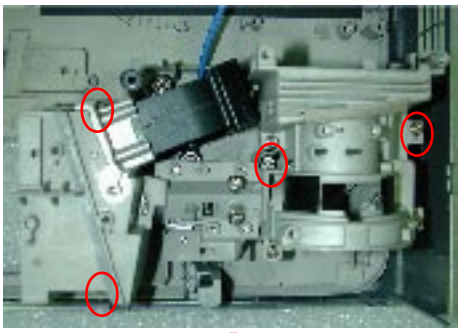
No	Procedure	Photo
9	Unscrew 1 screw to remove Color Wheel. Note: be careful not to scratch Color Wheel while removing.	 Color Wheel

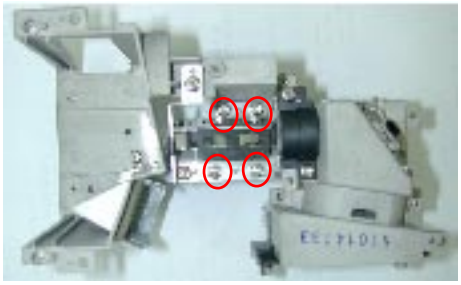
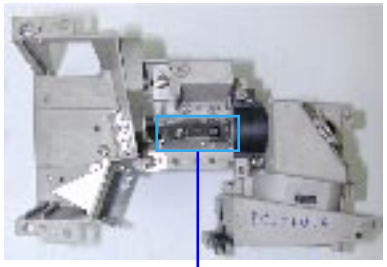
2-5 Disassemble DMD Board, DMD Chip, Thermal Switch, Focus Ring, Zoom Ring, Engine Module, Blower Fan and Elevator

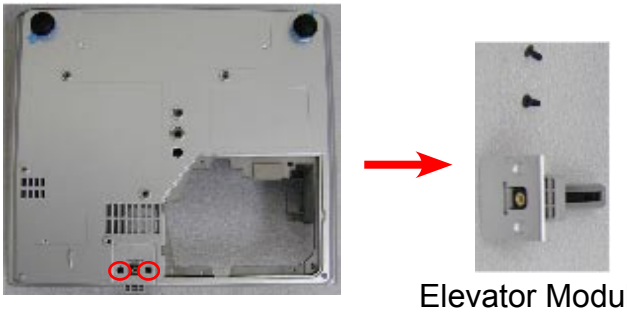
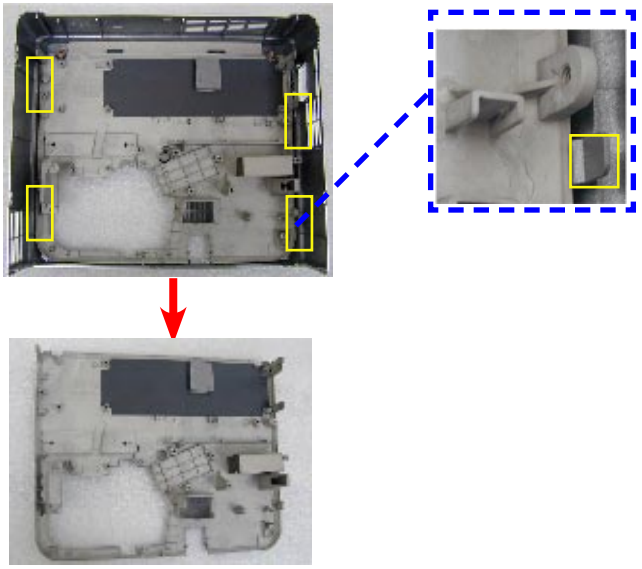
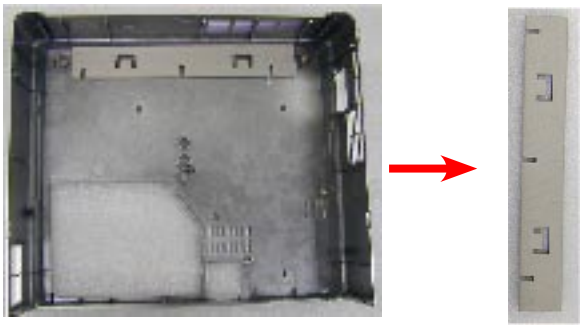
No	Procedure	Photo
1	Unscrew 4 screws to remove DMD Heatsink and DMD Heatsink Spring.	 
2	Unscrew 4 hex screws to remove DMD Module and DMD Board.	 DMD Board  Thermal Pad DMD Chip DMD Chip connector

No	Procedure	Photo
2	Assembly Notice: 1. Check if DMD pins are broken or tilted and if there is any remnant or dirt. 2. Please stick Thermal Pad in the middle of DMD socket (shown in red circle) and the edge of tape cannot touch DMD socket. 3. Protruding facet faces down (towards the insulation Maylar) 4. Insulation Mylar gap face right	 
3	Remove DMD Seal Rubber and DMD Mask Plate.	 

No	Procedure	Photo
4	Unscrew 1 screw to remove Thermal Switch.	 Thermal Switch
5	Unscrew 3 screws to remove Focus Ring Lightcut Mylar and Focus Ring.	  Focus Ring Lightcut Maylar Focus Ring
6	Unscrew 2 screws to remove Zoom Ring and Zoom Ring Holder.	  Zoom Ring Holder Zoom Ring

No	Procedure	Photo
7	Unscrew 3 screws to remove Projection Lens.	Projection Lens
8	Unscrew 1 screw to remove Lamp Lightcut Top.	Lamp Lightcut Top
9	Unscrew 4 screws to remove Engine Frame.	 Engine Frame

No	Procedure	Photo
10	Unscrew 4 screws to remove Rod Fix Plate and then Rod can be removed.	 Rod Fix Plate  Rod
11	Unscrew 3 screws to remove Blower Fan Module.	 Blower Fan

No	Procedure	Photo
12	Unscrew 1 screw to remove Elevator Foot	Elevator Foot
13	Remove 2 screws to re-move Elevator Module.	 Elevator Module
14	Loosen 4 tenons (in yellow circle) to remove Bottom Cover Shielding.	 Bottom Cover Shielding
15	Tear off EMI Bottom Gasket from Bottom Cover.	 Bottom Cover EMI Bottom Gasket

Chapter 3

Troubleshooting

Equipment Needed

- PC or pattern generator
- DVD player (Video, S-Video, Audio)
- Pattern generator: Quantum Data 802B or CHROMA 2327
- After changing parts, check the below information.

Adjustment Needed (after parts replacement & FW upgrade)

For example, after replacing Main Board, you need to do ADC and Video Calibration, and adjust Color Wheel Index. For details, please see Chapter 4.

Charge Parts/Update	Color Wheel Index	ADC Calibration	Video Calibration	Reset Lamp Use Time
M/B	v	v	v	
FW	v			
Color Wheel	v			
Lamp Module				v

LED Lighting Message

Normal Operation

Status \ Light	TEMP	POWER	LAMP
Standby	OFF	ON(O)	OFF
Normal(Power ON)	OFF	ON(O)	OFF
Powering up	OFF	Blink(G)	OFF
Cooling	OFF	Blink(O)	OFF
FW Programming mode.	ON(R)	Blink(O)	ON(R)

(R) -- RED

(O) -- ORANGE

(G) -- GREEN

Error Status

Status \ Light	TEMP	POWER	LAMP	Remark	Troubleshooting
Standby	OFF	ON(O)	OFF	After 5 sec. goto Standby	Check: 1. Lamp: 2. Lamp Driver 3. M/B
Normal(Power ON)	OFF	ON(O)	OFF		Check: 1. Lamp Door 2. Limit Switch.
Powering up	OFF	Blink(G)	OFF		Check: 1. Thermal Switch: 2. Thermal Sensor: 3. Fans 4. M/B.
Cooling	OFF	Blink(O)	OFF		Check: 1. Fans 2. M/B
FW Programming	ON(R)	Blink(O)	ON(R)		Check: 1. Color Wheel : 2. M/B

Main Procedure

No Power (No LED is lit)

- Ensure that the power cord and AC power outlet are properly connected.
- Ensure that all connectors are securely connected and aren't broken.
- Check Keypad Board
- Check Keypad Cable
- Check LVPS
- Check Main Board

Auto Shut Down

- Check LED Status : refer to LED Lighting Message

  a. Check Color Wheel

  - Check color wheel
  - Photo sensor

  b. No Power

  - Refer to "No Power" troubleshooting

No Image \ No Display (but some LED is lit)

- Ensure that the signal cable and source work well. (If you connect multiple sources at the same time, use the “Input” button on the control panel to switch.)
- Ensure that all connectors are securely connected and aren’t broken.
- Check Lamp Door (refer to LED Lighting Message)
- Check Limit Switch (refer to LED Lighting Message)
- Check Thermal Switch (refer to LED Lighting Message)
- Check Thermal Sensor (refer to LED Lighting Message)
- Check Fans (refer to LED Lighting Message)
- Check Color Wheel (refer to LED Lighting Message)
- Check Lamp (refer to LED Lighting Message)
- Check Lamp Driver (refer to LED Lighting Message)
- Check Main Board
- Check DMD Board

Mechanical Noise

- Check Color Wheel
- Check Fan Module

Line Bar/Line Defect

- Sometimes it’s because of DMD chip and DMD board did not assemble properly
- Check DMD Board
- Check DMD Chip
- Check Main Board

Image Flicker

- Do “Reset” of the OSD Menu.
- Ensure that the signal cable and source work well.
- Check Lamp Module
- Check Photo Sensor
- Check Color Wheel
- Check DMD Board
- Check Main Board

Color Abnormal

- Do “Reset” of the OSD Menu.
- Adjust Color Wheel Index (See Chapter 4 for Color Wheel Index Adjusment)
- Do PC on Video Calibration (See Chapter 4 for Video Calibration)
- Check Main Board
- Check DMD Board
- Check Color Wheel

Poor Uniformity/Shadow

- Ensure the projection screen without dirt.
- Ensure the projection lens is clean.
- Ensure the Brightness is within spec.
  (Replace the Lamp if the Brightness is less than spec.)
- Check Engine Module

Dead Pixel/Dust (Out of spec.)

- Ensure the projection screen without dirt
- Ensure the projection lens is clean
- Clean DMD Chip and Engine Module
- Check DMD Chip
- Check Engine Module

Garbage Image

- Ensure that the signal cable and source work well.
- Check Main Board
- Check DMD Board

Remote Controllor or Control Panel Failure

- Remote Control
  a. Check Battery
  b. Check Remote Controller
  c. IR receiver
- Control Panel
  a. Check FPC (Keypad Cable)
  b. Check keypad
  c. Check Main Board

Function Abnormal

- Do “ Reset” of the OSD menu
- Check Main Board
- Check DMD board

Chapter 4

Function Test & Alignment Procedure

4-1 Test Equipment

- IBM PC with XGA and SVGA resolution (Color Video Signal & Pattern Generator)
- DVD player with Local Video System
- HDTV Tuner or Source (480i/p, 576 i/p, 720p, 1080i), equipped with “S-Video”, “Component”, “Composite” interface.
- Minolta CL-100 (Luminator)
- Patern Generator: Quantum Data 802B or CHROMA2327 (Suggested)

4-2 Test Condition

- Circumstance Brightness : Dark room less than 2.5 lux.
- Inspection Distance : 1.5m~3m for functional inspection
- Screen Size : 60 inches diagonal
- After repairing each projector, the unit should be burn-in (Refer to the table below).

Symptom	Burn-in Time
Normal Repair	2 Hours
NFF	4 Hours
Auto Shutdown	6 Hours

- Note: Enter Factory Mode to execute “Burn In test.”
(See page 4-7 or Appendix for hot keys)

4-3 Test Display Modes & Pattern

Function Test Display Pattern

Item	Test Content	Pattern	Specification	Remark
1	Frequency & Tracking	Fine Line Moire	Eliminate visual wavy noise by Rsync, Frequency or Tracking selection.	Figure 1
2	Contrast/Brightness	64 RGBW scale	Gray level should be distinguishable and without color abnormal.	Figure 2
3	R, G, B and White Color Performance	R, G, B and White Color	Each R, G, B color should be normal without color abnormal issue.	Figure 3~6
4	Screen Uniformity	Full White	Should be compliant with 60%.(Minimum)	Figure 6
5	Dead Pixel (Bright pixel)	Full Black	Cannot accept any bright pixel	Figure 7
	Dead Pixel (Dark pixel)	Full White	The numbers of dead pixel should be smaller or amount to 6 pixel.	Figure 8
6	Blemish (Bright)	Full Black / Gray 30	The bright blemish cannot be accepted if the problem appear with Gary 30 pattern.	Figure 7, 8
7	Blemish (Dark)	Full white / Blue 60	The dark blemish cannot be accepted if the problem appear with Blue 60 pattern.	Figure 6,9
8	Focus	Text Pattern	The text in the corner should be clear after adjust the focus ring.	Figure 10
9	Boundary	Boundary Frame	Horz. And Vert. position of video should be adjustable to be the screen frame.	Figure 11
10	Video Calibration	94% White	No discolor	Figure 12
11	ADC Calibration (PC Calibration)	Calibration Pattern	Calibration Pattern should be in full screen mode	Figure 13

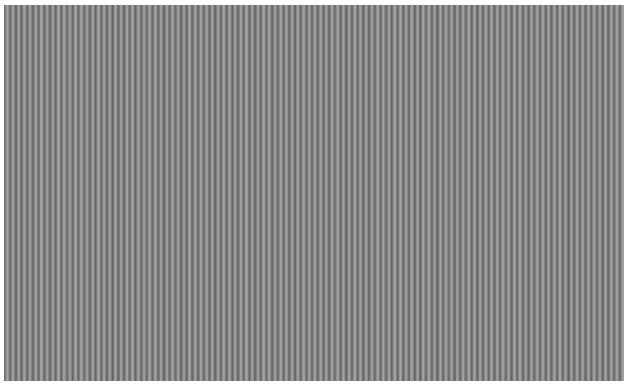


Figure 1. Fine Line Moire

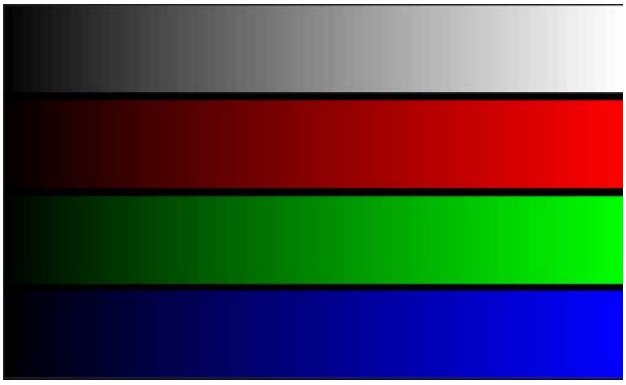


Figure 2. 64 RGBW Scale

Figure 3. Red Pattern

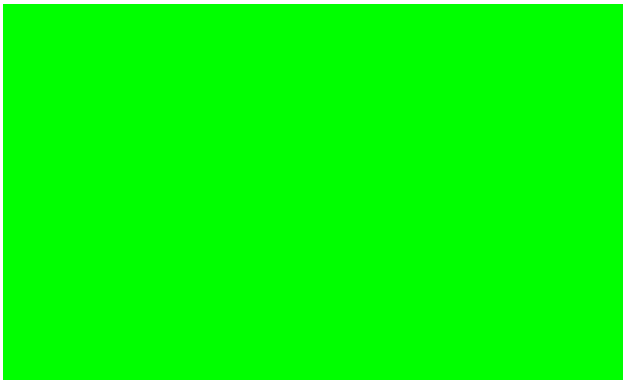


Figure 4. Green Pattern

Figure 5. Blue Pattern

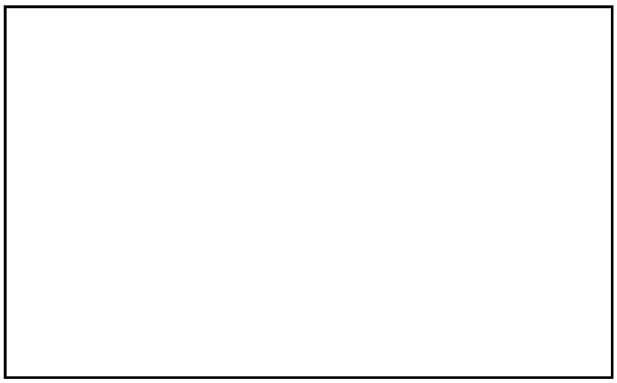


Figure 6. Full White

Figure 7. Full Black

Figure 8. Gary 30 Pattern

Figure 9. Blue 60 Pattern

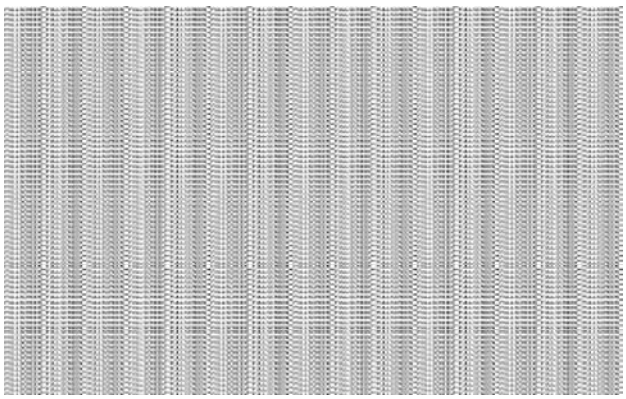


Figure 10. Text Pattern

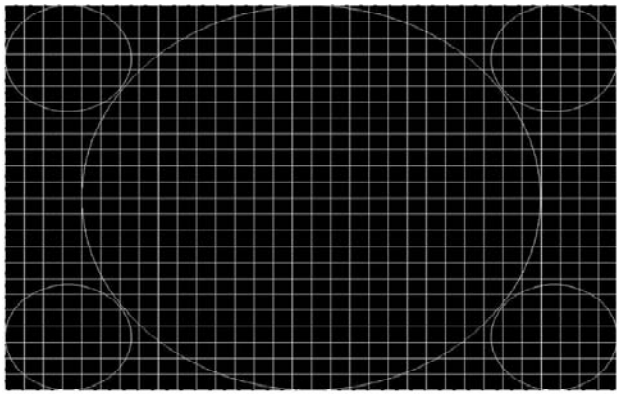


Figure 11. Boundary Frame

Figure 12. 94%white

Figure 13. Calibration Pattern

4-4 Inspection Procedure

Note: Do "Reset" in OSD menu before function test.

- **Frequency and Tracking**

Test Signal : 1024x768@60Hz (T8/T9); 800x600@60Hz (S8)

Test Pattern : Line Moire Pattern

* Check and see if image sharpness and focus are well performed.
* If not, readjust by following steps.
  (1) Select "Frequency" function to adjust the total pixel number of pixel clock in one line period.
  (2) Then select "Phase" function and use right or left arrow key to adjust the value to minimize video flicker.

- **Boundary**

Test Signal : 1024x768@60Hz (T8/T9); 800x600@60Hz (S8)

Test Pattern : Boundary Frame

* Adjust Resync or adjust Frequency/H. Position/V. Position to the inner of the screen.

- **Focus**

Test Signal : 1024x768@60Hz (T8/T9); 800x600@60Hz (S8)

Test Pattern : Text Pattern

* Adjust the center clearly, meanwhile, one slightly vague corner in the image is allowed

Calibration in Factory Mode

(See Page 4-7 or Appendix for hotkeys)

After Main Board is changed or firmware is upgrade, the calibration is needed to ensure good color performance.

- **Video Calibration**

Test Signal : HDTV Signal (720p) (Plug in HDTV signal cable into VGA port)

Test Pattern : Calibration Pattern (Figure 12)

Get into Factory Mode to **execute video calibration.**

- **ADC Calibration (PC Calibration)**

Test Signal : 1024x768@60Hz (T8/T9); 800x600@60Hz (S8)

Test Pattern : Calibration Pattern (Figure 13)

* Enter Factory Mode to execute PC Calibration.

* Calibration Pattern should be in full screen mode, white above and black below.

- **DTV / HDTV**

Equipment : CHROMA 2327 or DVD player

Test Signal : 480i, 480p, 720P, 1080i

Please ensure the projector can display DTV/HDTV signal without color or image abnormal.

If the test result was discoloration or flickering, please return the unit back to the repair area.

- **Color Performance and contrast**

Test Signal : 1024x768@60Hz (T8/T9); 800x600@60Hz (S8)

Test Pattern : 64 RGBW scale Pattern

* Please check and ensure if each color is normal and distinguishable
* If not,please adjust color Wheel index in the Factory mode. (See Page 4-7 or Appendix for hot keys.

- **Blemish (Bright)**

Test signal: 1024x768@60Hz (T8/T9); 800x600@60Hz (S8)

Test Pattern: Gray 30 pattern

* Please check and ensure the unit is within the spec.
  (The bright blemish should not be seen under Gray 30 pattern.)
* If out of spec, please return the unit to repair area.

- **Blemish (Dark)**

Test signal: 1024x768@60Hz (T8/T9); 800x600@60Hz (S8)

Test Pattern: Blue 60 pattern

* Please check and ensure the unit is within the spec.
  (The dark blemish should not be seen under Blue 60 pattern.)
* If out of spec, please return the unit to repair area.

- **Video**

Test signal: Composite video, S-Video and Component Video

Test Pattern: NTSC, PAL, SECAM

* Please check and ensure the unit can display the video signal without color abnormal or image abnormal issue.
* If out of spec, please return the unit to repair area.

- **Audio**
  * Please check and ensure the function of audio works well. (Volume, Treble, Bass, Mute)
  * If not, please return the unit to repair area.

- **Screen Uniformity**

  Test Signal : 1024x768@60Hz (T8/T9); 800x600@60Hz (S8)

  Test Pattern : Full White Pattern

  * Please check and ensure the unit is under the spec.
  * Please check and see if it's in normal condition.If not, please return the unit to repair area.
  * The total numbers and distance of dead pixels should be complaint with the spec.

- **Dead Pixel (Bright/Dark pixel)**

  Test Signal : 1024x768@60Hz (T8/T9); 800x600@60Hz (S8)

  Test Pattern : Full Black Pattern and Full White Pattern

  (1) Bright Pixel :

  Test Pattern : Full Black Pattern

  -Please check and ensure that the unit cannot accept any bright pixel. (Suggested)

  -If not, please return the unit to repair area.

  (2) Dark Pixel :

  Test Pattern : Full White Pattern

  -Please check and ensure that the pixel number should be less than 6 pixels (Suggested)

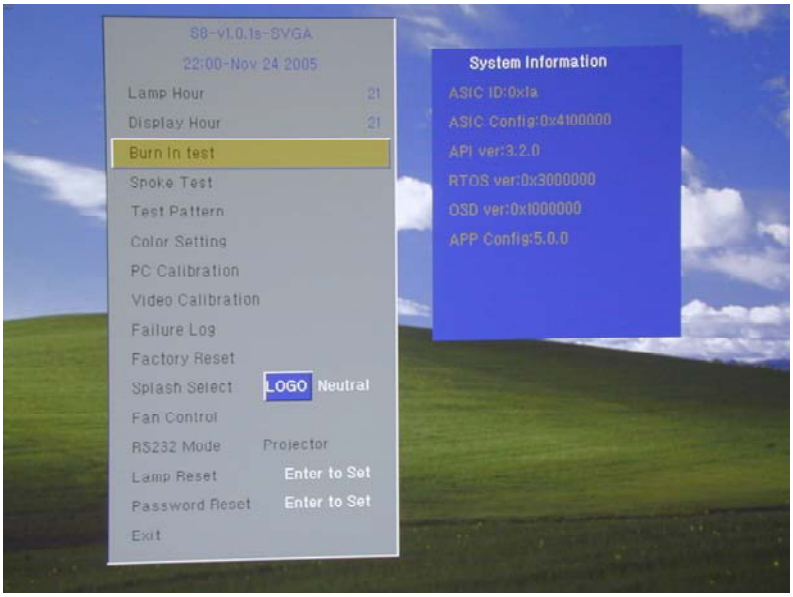
  -If not, please return the unit to repair area.

4-6 Guide to Entering Factory Mode and Reset in OSD

Only functions concerning repair are introduced. For functions not introduced are reserved for engineering use.

How to enter Factory Mode:

1. Must be with signal input.
2. Hot key: press "ON/STANDBY" "VOL-" "VOL-" "MENU" sequentially to enter Fac tory Mode. (See the below pic)



Reset in OSD

After final QC step, we have to erase all saved change again and restore the factory defaults.

Please enter the OSD mode to do the “Reset” then choose “YES” and press enter to see if it works.

This action will allow you to erase all end-user’s settings and restore the original setting.

Chapter 5

Firmware Upgrade Procedure

5-1 Equipment Needed

Software：

- DLP Composer Lite
- Firmware (S8/T8/T9) (*.img file)

Note: The FW upgrade procedure for T9/T8/S8 is the same. Here, we take S8 as an example.

Hardware：

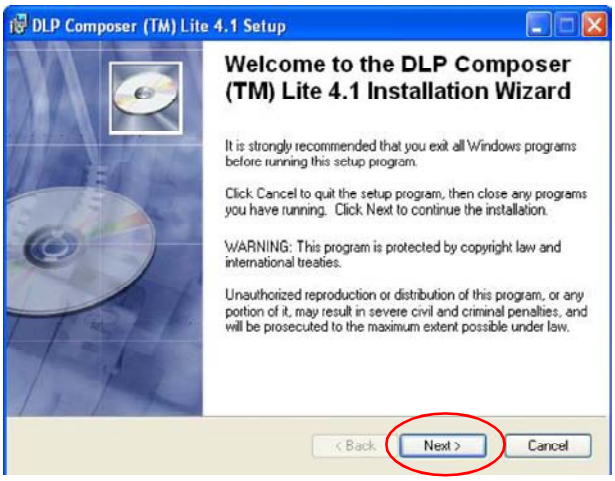
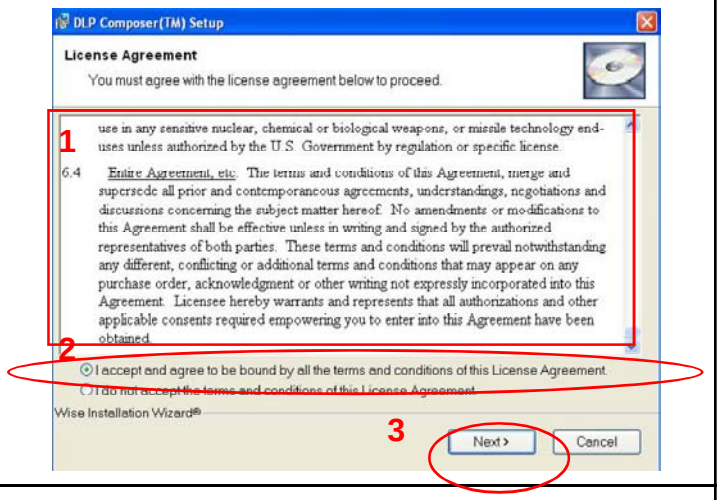
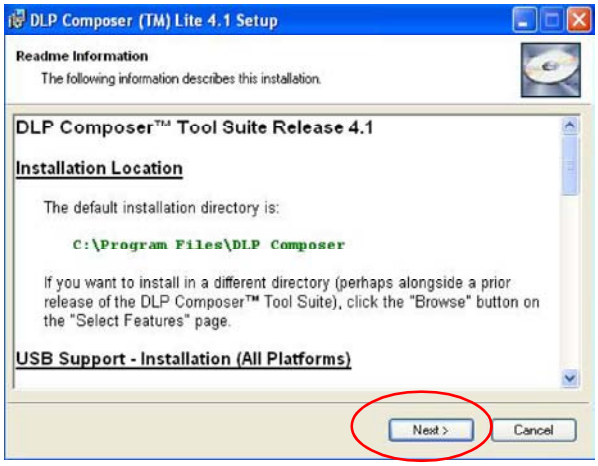
Item	Photo	Item	Photo
Projector (S8/T8/T9)		8-pin RS232 Cable	Note: This cable is the same as T90 & T90A/MT200/MT400 series.
Power Cord		PC or Laptop	

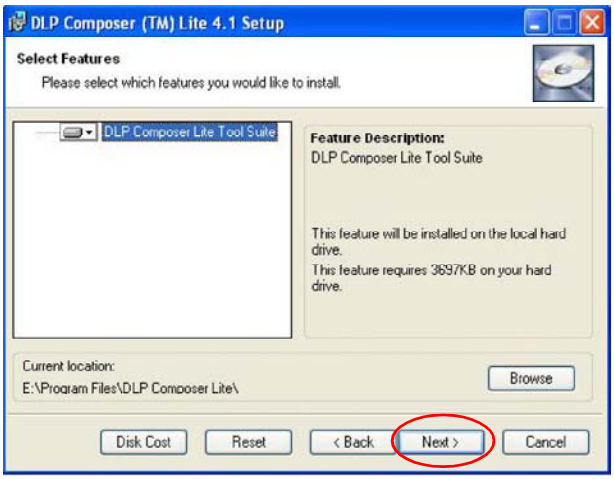
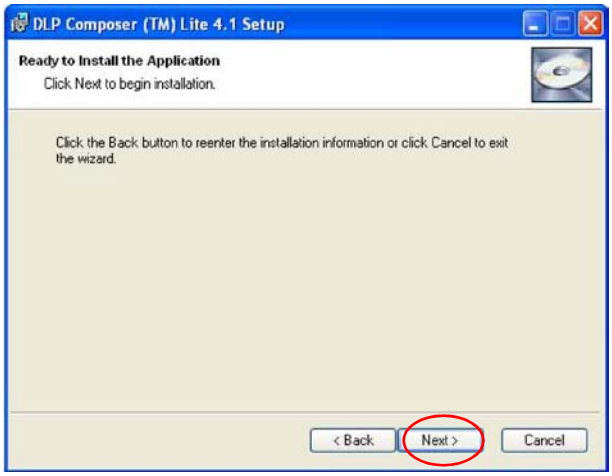
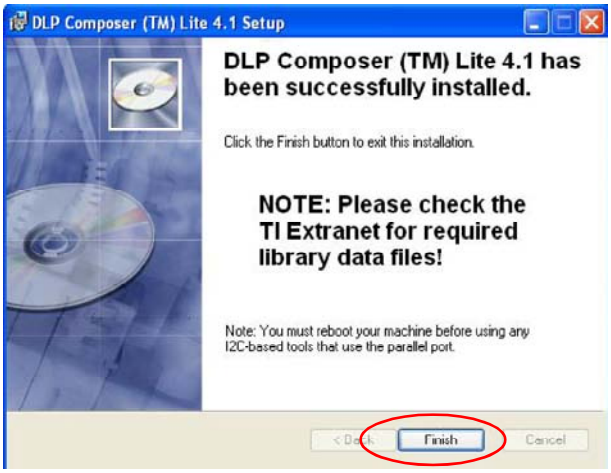
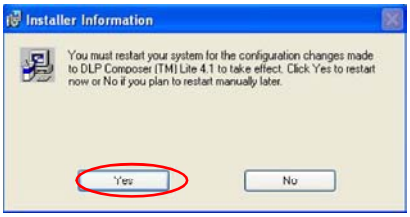
Connection:
Connect the serial port of your PC on laptop with the “Control” port of S8 by the 8-pin RS232 cable.

FW Upgrade Mode:
Press and hold “INPUT” and “MENU” buttons of S8 and plug in the power cord to S8. Release “INPUT” and “MENU” buttons after TEMP, POWER & LAMP LEDs are all lit.

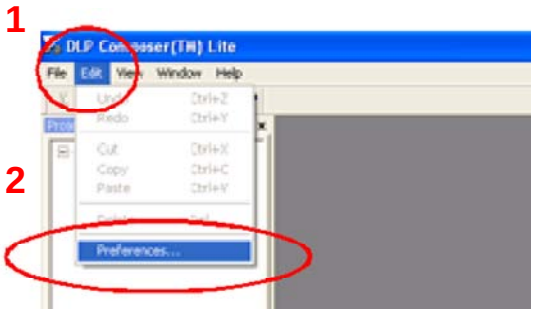
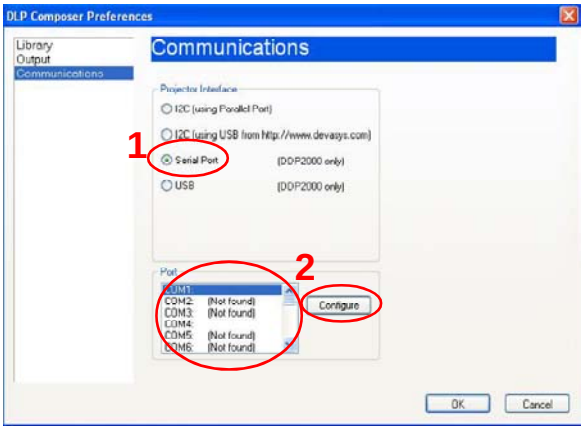
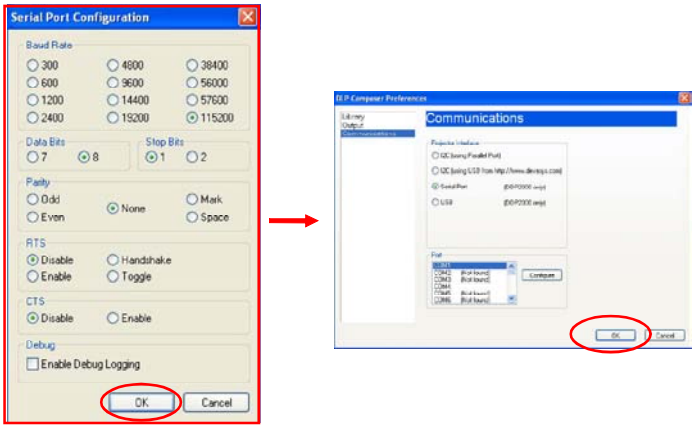
5-2 Installation Procedure

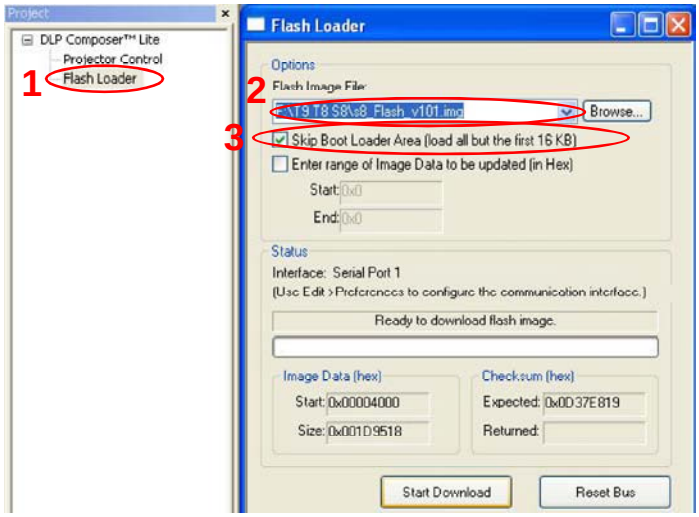
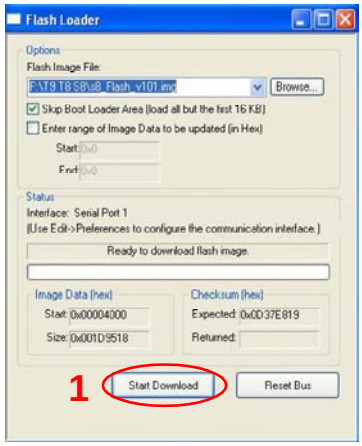
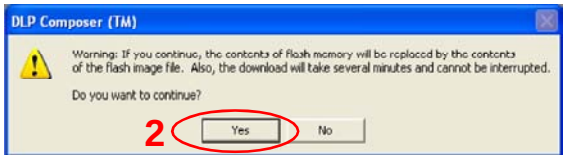
5-2.1 DLP Composer Lite Installation Procedure (Must use Ver. 4.1)

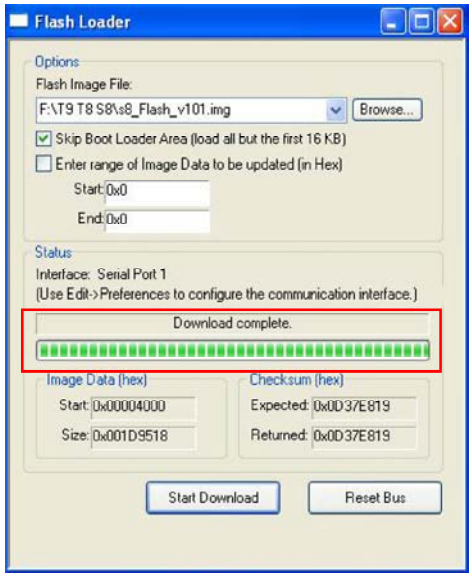
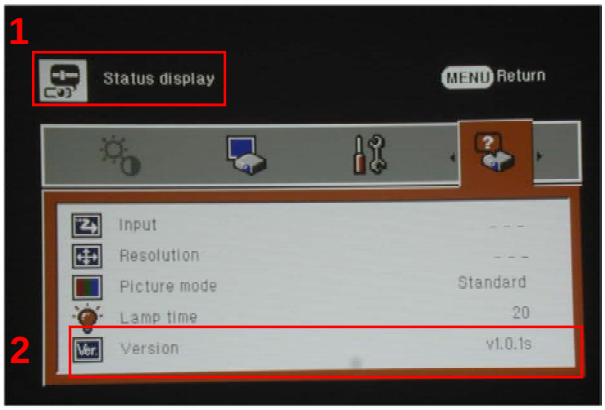
No	Step	Procedure	Photo
1	DLP Composer Lite Installation file	Choose "DLP Composer Lite v4.1 Setup" program.	
2	Next	Click "Next" button.	
3	Next	1. Reading the "License Agreement" rules. 2. Choose "I accept and agree to be bound by all the terms and conditions of this License Agreement" icon, 3. Click "Next" button.	
4	Next	Click ""Next"" button.	

No	Step	Procedure	Photo
5	Next	1. Click "Next" button.	
6	Next	Click "Next" button.	
7	Finish	Press "Finish" button.	
8	Reboot	Click "Yes" button to reboot.	

5-3 Firmware Upgrade Procedure

No	Step	Procedure	Photo
1		Execute the "DLP Composer™" file.	
2		Click "Edit" and "Preferences".	
3		1. Select "Edit\Preferences\ Communications" and choose "Serial Port". 2. Click the serial port connected. Here we select COM1. 3. Press "Configure"	
4		1. Make sure the setting is same as the left picture shows. 2. Press "OK"	

No	Step	Procedure	Photo
5		1. Choose "Flash Loader" 2. Click "Browse" to search the S8 Firmware. (*.img.file) 3. Select the item "Skip Boot Loader Area (load all but the first 16KB)."	
6		1. If the firmware is ready, click "Start Download" to process the firmware upgrade. 2. Click "Yes" to continue.	 

No	Step	Procedure	Photo
7	"Download Complete" Message	After the firmware is successfully loaded, you will see "Download Complete" message and only the Power LED is lit (Standby Mode). (The FW upgrade will take about 6 minutes.) Unplug and re-plug the power cord of the projector.	
8	Checking Firmware Version	Power on the projector and press "MENU" button to launch OSD menu. Select "Status display" to check the firmware version	

Chapter 6

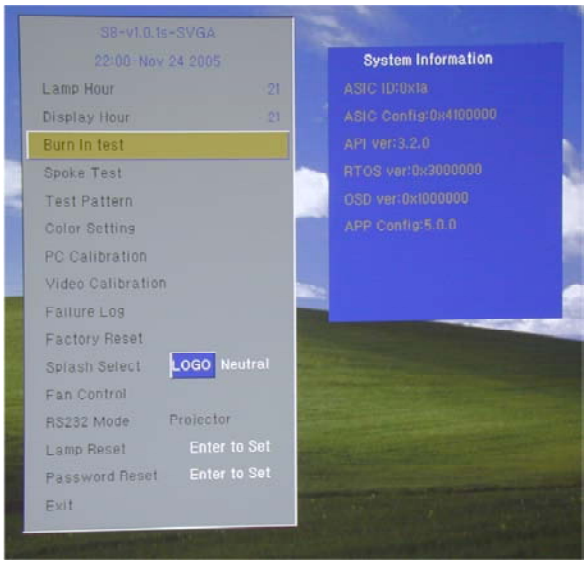
Firmware Upgrade Procedure

I. Factory Mode Introduction

Only functions concerning repair are introduced. Functions not introduced are reserved for engineering use.

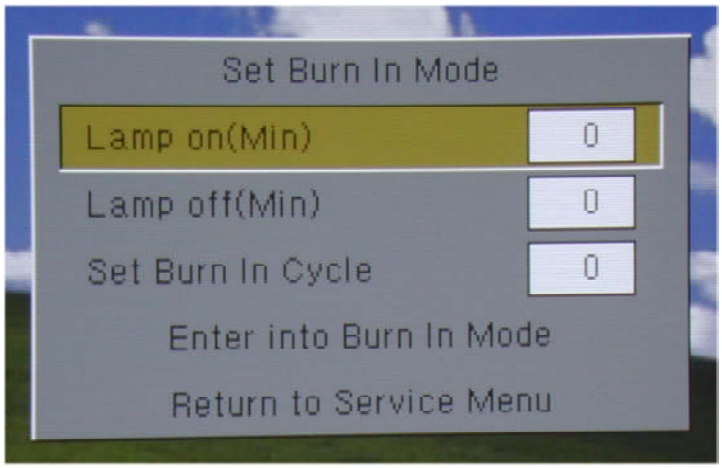
How to enter Factory Mode:

1. Must be with signal input.
2. Hot key: press “ON/STANDBY” “VOL-” “VOL-” “MENU” sequentially to enter Factory Mode. (See the below pic)



Burn In Mode

Select “Burn In Mode” and then press “Enter” key to enter Burn In Mode.

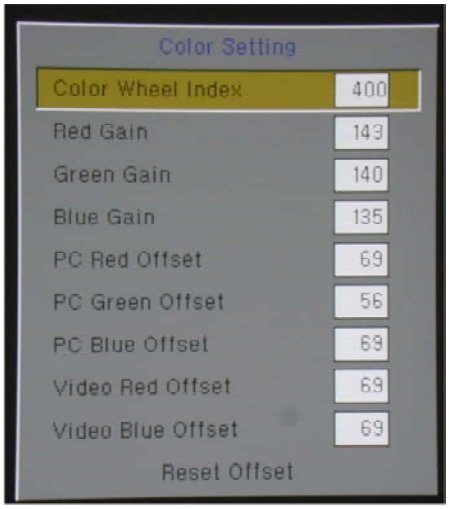


Test Pattern

Select “Test Pattern” and then press “Enter” key to activate “Test Pattern” for function test.

Color Wheel Index

Select “Color Setting” and then press “Enter” key to Enter “Color Setting.”
Choose “Color Wheel Index” and then the color wheel index can be adjusted by “Left” and “Right” keys.



PC Calibration

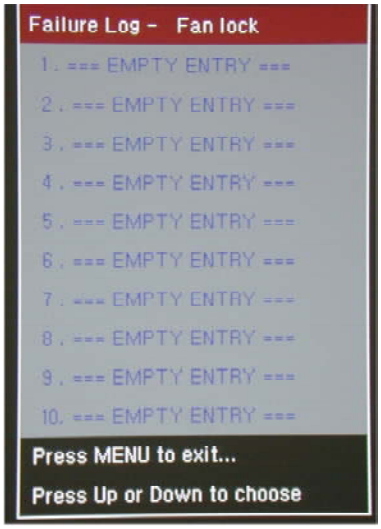
Select “PC Calibration” and then press “Enter” to execute PC Calibration.

Video Calibration

Select “Video Calibration” and then press “Enter” to execute Video Calibration.

Failure Log

Select “Failure Log” and then press “Enter” key to enter Failure Log Menu. Use “Left” and “Right” keys to choose the failure log category.


Failure Log - Fan lock
1. === EMPTY ENTRY ===
2. === EMPTY ENTRY ===
3. === EMPTY ENTRY ===
4. === EMPTY ENTRY ===
5. === EMPTY ENTRY ===
6. === EMPTY ENTRY ===
7. === EMPTY ENTRY ===
8. === EMPTY ENTRY ===
9. === EMPTY ENTRY ===
10. === EMPTY ENTRY ===
Press MENU to exit...
Press Up or Down to choose

Chapter 7

Spare part

No.	Location No.	Part No.	Description	S8	T8	T9
1	E001	23587256	SOCKET, 0.55 SVGA DMD	V	V	V
2	E002	23587877	LENS, PROJECTION T8 T9		V	V
3	E003	23587878	LENS, PROJECTION S8	V		
4	A001	23587879	LABEL, SERIAL NUMBER TDP-T90	V	V	V
5	A002	23587880	LABEL, LENS CAUTION TDP-T90	V	V	V
6	A003	23587881	LABEL, HOT CAUTION TDP-T90	V	V	V
7	A004	23587882	LABEL, LAMP BREAK CAUTION TDP-T9	V	V	V
8	A005	23587883	LABEL, BOTTOM CAUTION TDP-T9		V	V
9	A006	23587884	LABEL, SPEC TDP-T9			V
10	A007	23587885	LABEL, SPEC TDP-T8		V	
11	A008	23587886	LABEL, LAMP CAUTION TDP-T9		V	V
12	A009	23587887	LABEL, LAMP BOTTOM CAUTION TDP-S8	V		
13	A010	23587888	LABEL, LAMP CAUTION TDP-S8	V		
14	A011	23587889	LABEL, SPEC TDP-S8	V		
15	Y001	23587890	USER'S MANUAL, USA+EUR T9			V
16	Y002	23587891	USER'S MANUAL, JAPANESE T9			V
17	Y003	23587892	USER'S MANUAL, CHINA T9			V
18	Y004	23587893	USER'S MANUAL, USA+EUR T8		V	
19	Y005	23587894	USER'S MANUAL, JAPANESE T8		V	
20	Y006	23587895	USER'S MANUAL, CHINA T8		V	
21	Y007	23587896	CD-ROM, USER'S CD GUIDE MULTILINGUAL T9			V
22	Y008	23587897	CD-ROM, USER'S CD GUIDE MULTILINGUAL T8		V	
23	Y009	23587898	CD-ROM, USER'S CD GUIDE MULTILINGUAL S8	V		
24	Y010	23587899	USER'S MANUAL, USA+EUR S8	V		
25	Y011	23587900	USER'S MANUAL, JAPANESE S8	V		
26	Y012	23587901	USER'S MANUAL, CHINA S8	V		
27	W001	23587902	WIRE HARNESS, 210mm LVPS TO MB TDP-T90	V	V	V
28	Y013	23587319	POWER CORD, AC 3M EU TDP-T90	V	V	V
29	Y014	23587320	POWER CORD, AC 3M UK TDP-T90	V	V	V
30	Y015	23587322	POWER CORD, AC 3M CN TDP-T90	V		V
31	W002	23587903	WIRE HARNESS, 2P 160mm LAPS/BALLAST	V	V	V
32	W003	23587904	CABLE, FFC 14P 100mm EP719	V	V	V
33	W004	23587905	WIRE HARNESS, AC-IN TDP-T9	V	V	V
34	Y016	23587906	CABLE, RGB VGA 15P 3M TDP-T9	V	V	V
35	W005	23587907	WIRE HARNESS, 14P 130mm LVPS TO M/B 2200MI	V	V	V
36	Y017	23587253	POWER CORD, AC 3M US	V	V	V
37	E004	23587908	THERMAL SWITCH, WITH CORE	V	V	V
38	Y018	23587909	REMOTE MOUSE CONTROLLER, LASER TDP-T9			V

39	Y019	23587910	RECEIVER, REMOTE MOUSE T9			V
40	Y020	23587911	REMOTE CONTROLLER, TDP-S8	V	V	
41	E005	23587734	DMD, 1024*768 PIXEL DDR FTP 0.55" XGA		V	V
42	E006	23587874	DMD, 800*600 PIXEL DDR FTP 0.55" SVGA	V		
43	E007	23587912	SPEAKER, 2W 4ohm 150mm EP732	V	V	V
44	E008	23587913	BLOWER, SUSON 4520 R TYP	V	V	V
45	E009	23587914	FAN, 70x20 SYSTEM	V	V	V
46	E010	23587915	INSULATOR, DMD MYLAR 0.435t T90	V	V	V
47	A012	23587916	ZOOM RING, PC+ABS-CA08 TDP-T9	V	V	V
48	B001	23587917	FOOT, ELEVATOR PC+ABS	V	V	V
49	A013	23587918	COVER, TOP PC+ABS-CA07A TDP-T9			V
50	A014	23587919	COVER, TOP PC+ABS-CA08 TDP-S8	V		
51	A015	23587920	COVER, TOP PC+ABS-CA07A TDP-T8		V	
52	A016	23587921	COVER, BOTTOM PC+ABS-CA07 TDP-T9		V	V
53	A017	23587922	COVER, BOTTOM PC+ABS-CA08 TDP-S8	V		
54	A018	23587923	COVER, FRONT PC+ABS-CA08 TDP-T9	V		V
55	A019	23587924	COVER, FRONT PC+ABS-CA08 TDP-T8		V	
56	A020	23587925	COVER, BACK PC+ABS-CA07A TDP-T9		V	V
57	A021	23587926	COVER, BACK PC+ABS-CA08 TDP-S8	V		
58	A022	23587927	BUTTON, KEY PAD PC+ABS Cr TDP-T9	V	V	V
59	A023	23587928	LENS, IR FRONT PC TDP-T9	V	V	V
60	A024	23587929	FOCUS RING, PC+ABS-CA08 TDP-T9	V	V	V
61	A025	23587930	PAD, ENTER KEY PC+ABS-CA08 TDP-T9	V	V	V
62	A026	23587274	SPRING, ENTER KEY PE FORM 2.0t TDP-T90	V	V	V
63	B002	23587276	SPACER, ADJUST FOOT 3.0t RUBBER TDP-T90	V	V	V
64	Y021	23587931	SOFT CASE, CARRYING BAG TDP-T9	V	V	V
65	A027	23587932	CARTON, B-14 396*330*190mm TDP-T9	V	V	V
66	A028	23587933	PAPER CUSHION, B-14 390*175*112mm TDP-T9	V	V	V
67	E011	23587934	PLATE, DMD HEATSINK BACKER A6061 739	V	V	V
68	E012	23587935	HEATSINK, DMD AL 1070 DP718	V	V	V
69	E013	23587936	SPRING, DMD HEATSINK PLATE 0.4t Ivy10X	V	V	V
70	E014	23587299	SCREW, DMD Ivy10X	V	V	V
71	B003	23587937	ELEVATOR MODULE ASSY TDP-T9		V	V
72	E015	23587938	OPTICAL BLOCK, TDP-T9		V	V
73	B004	23587939	ROD MODULE, OPTICAL TDP-T9	V	V	V
74	B005	23587940	ADJUST FOOT ASSY TDP-T9	V	V	V
75	A029	23587941	COVER, LAMP MODULE T9 "GREEN" (RMA)		V	V
76	U001	23587942	PC BOARD ASSY, KEYPAD MODULE TDP-T9	V	V	V
77	E016	23587943	COLOR WHEEL, T9 "GREEN" (RMA)	V	V	V
78	E017	23587944	OPTICAL BLOCK, SUB ASSY T9	V	V	V
79	A030	23587945	COVER, LAMP MODULE S8	V		
80	B006	23587946	ELEVATOR MODULE ASSY TDP-S8	V		
81	E018	23587947	OPTICAL BLOCK, TDP-S8	V		
82	A031	23587948	COVER, EMI SHIELDING BACK TDP-T9	V	V	V

83	A032	23587949	CAP, KEY PAD TDP-T9		V	V
84	A033	23587950	CAP, LENS TDP-T9	V	V	V
85	P001	23587951	PC BOARD ASSY, LVPS LITE ON 200W S8	V	V	V
86	P002	23587952	PC BOARD ASSY, LAMPDRIVER 230W/75%	V	V	V
87	A034	23587953	CAP, KEY PAD TDP-S8	V		
88	E019	23587954	SWITCH, LIMIT CHERRY DB3C A1LB-5A	V	V	V
89	P003	23587955	WIRE HARNESS,LAMP DRIVER TO LAMP HD72	V	V	V
90	U002	23587956	PC BOARD ASSY, DMD EP719	V	V	V
91	U003	23587957	PC BOARD ASSY, PHOTO SENSOR EP719	V	V	V
92	U004	23587958	PC BOARD ASSY, THERMAL SENSOR PD120	V	V	V
93	U005	23587959	PC BOARD ASSY, MAIN T9 XGA			V
94	U006	23587960	PC BOARD ASSY, MAIN TDP-T8 XGA		V	
95	U007	23587961	PC BOARD ASSY, IR SENSOR TDP-T9	V	V	V
96	U008	23587962	PC BOARD ASSY, MAIN TDP-S8 SVGA	V		

T O S H I B A C O R P O R A T I O N
1-1, SHIBAURA 1- CHOME, MINATO - KU, TOKYO 105 - 8001, JAPAN